# Araticum (Annona crassiflora) seed powder (ASP) for the treatment of colored effluents by biosorption

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## Abstract

Dyes are widely used in many industrial sectors, many contain harmful substances to human health, and their release into the environment entails several environmental problems, generating a major worldwide concern as water resources are increasingly limited. The development of cheap and efficient biosorbents that remove these pollutants is of utmost importance. In this study, powdered seeds of the araticum fruit (Annona crassiflora) were used in the biosorption of crystal violet (CV) dye from aqueous solutions and simulated textile effluents. Through the characterization techniques, it can be observed that the material presented an amorphous structure, containing an irregular surface composed mainly by groups containing carbon, hydrogen, and oxygen. CV biosorption was favored at the natural pH of the solution (7.5) for a dosage of 0.7 g $L^{-1}$ of araticum seed powder. The pseudo-second-order model was the most suitable to represent the biosorption kinetics in the removal of the CV. Biosorption capacity reached equilibrium in the first minutes at the lowest concentrations, and, at the highest, after 120 min. The equilibrium data were well represented by the Langmuir model, with a maximum biosorption capacity of 300.96 mg $g^{-1}$ at 328 K. Biosorption had a spontaneous and endothermic nature. In the treatment of a simulated effluent, the biosorbent removed 87.8% of the color, proving to be efficient. Therefore, the araticum seeds powder (ASP) can be used as a low-cost material for the treatment of colored effluents containing the crystal violet (CV) dye.

## Keywords

Araticum seeds; Batch adsorption; Crystal violet; Simulated effluent.